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## A REVIEW OF THE SPECIES OF THE GENUS PIMEPHALES.

BY WILLIS S. BLATCHLEY.

I have examined numerous specimens of *Pimephales* and *Hyborhynchus* from various parts of the United States, with a view to discrimination of the species.

The genus *Hyborhynchus* is evidently unworthy of retention, and the entire group is, in my opinion, composed of but two species, *Pimephales promelas* and *Pimephales notatus*.

I give the synonymy of each and an analytical key giving the principal characters by which they may be separated.

The specimens examined belong to the Museum of the Indiana University.

*a.* Body comparatively short and deep, the greatest depth about 4 times in length of body; head short, convex, almost as broad as long in the adult, its length 4 in body; mouth slightly oblique; lateral line of various lengths, sometimes wanting on twenty or more scales; sometimes complete (variety *confertus*); origin of dorsal midway between pupil and base of caudal; ventrals reaching to or beyond first ray of anal; head, dorsal and pectoral fins of breeding males jet black, the snout with a few moderate-sized tubercles; scales 8-47-6. *Promelas*. 1.

*aa.* Body elongate, rather slender, the greatest depth about  $4\frac{3}{4}$  times in length of body; head comparatively long, its length  $4\frac{1}{2}$  in body, its surface much depressed above and descending abruptly in front of nostrils; mouth horizontal; lateral line complete; origin of dorsal midway between snout and base of caudal; ventrals not reaching vent; males in spring with 16 large nuptial tubercles, often accompanied by a small protuberance of skin, resembling a barbel, at angle of mouth; scales 6-44-4. *Notatus*. 2.

1. *Pimephales promelas* Raf.

*Pimephales promelas* Rafinesque, Ichth. Oh., 1820, 53 (Lexington, Ky.); Kirtland, Rept. Zool. Ohio, 1838, 194; Kirtland, Bost. Jour. Nat. Hist., iii, 1838, 475; Storer, Synopsis, 1846, 418; Agassiz, Amer. Jour. Sci. Arts, 1855, 220; Putnam, Bull. M. C. Z., 1863, 8; Günther, Cat. Fish. Brit. Mus., vii, 1863, 181; Jordan, Ind. Geol. Surv., 1874, 224; Jordan, Bull. Buff. Soc. Nat. Hist., 1876, 94;

Jordan, *Man. Vert.*, 1st ed., 1876, 275; 2d ed., 1878, 288; 3d ed., 1880, 288; Nelson, *Bull. Ill. Lab. Nat. Hist.*, i, 1876, 45 (Bailey's Creek, Ill., Evanston, Ill.); Jordan & Copeland, *Check List Fresh Water Fish. N. A.*, 1876, 146; Jordan, *Bull. U. S. Nat. Mus.*, ix, 1877, 32; Jordan, *Annals N. Y. Acad. Sci.*, 1877, No. 4, 107 (Wisconsin R., Pecatonica R., Ohio R., Kentucky R.); Jordan, *Bull. Ill. Lab. Nat. Hist.*, ii, 1878, 55 (Bailey's Cr.; Rock R., Ill.); Jordan & Brayton, *Bull. U. S. Nat. Mus.*, xii, 1878, 78 (Tributaries Cumberland R.); Jordan, *Bull. Hayden's Geol. Surv.*, iv, 1878, 402, 419 and 783 (Rio Grande); Jordan, *Rept. Geol. Surv. Ohio*, iv, 1882, 839; Jordan & Gilbert, *Synopsis Fish. N. A.*, 1883, 158; Bean, *Cat. Fish. Internat. Fish Exhibition, London, 1883*, 95 (Lake Beaver, Peterborough).

*Pimephales maculosus* Girard, *Proc. Acad. Nat. Sci. Phila.*, 1856, 180 (Arkansas R.); Girard, *Pac. R. R. Surv.*, x, 1858, 234 (Arkansas R.).

*Pimephales fasciatus* Girard, *Proc. Acad. Nat. Sci. Phila.*, 1856, 180 (Yellowstone R.; Milk R.); Girard, *Pac. R. R. Surv.*, x, 1858, 234 (Yellowstone R.; Milk R.).

*Hyborhynchus confertus* Girard, *Proc. Acad. Nat. Sci. Phila.*, 1856, 179 (Pecos R.); Girard, *Pac. R. R. Surv.*, x, 1858, 233 (Pecos R.); Jordan & Gilbert, *Synopsis Fish. N. A.*, 1883, 159.

*Plurgyrus melanocephalus* Abbott, *Proc. Acad. Nat. Sci. Phila.*, 1860, 325 (Lake Whittelsey, Minn.).

*Pimephales milesii* Cope, *Proc. Acad. Nat. Sci. Phila.*, 1864, 282 (Detroit R.); Günther, *Cat. Fish. Brit. Mus.*, vii, 1868, 181 (copied); Nelson, *Bull. Ill. Lab. Nat. Hist.*, i, 1876, 45; Jordan, *Man. Vert.*, 1st ed., 1876, 276.

*Pimephales agassizii* Cope, *Cyp. Penn.*, 1866, 394 (Whitewater R., Ind.); Jordan, *Ind. Geol. Surv.*, 1874, 224.

*Hyborhynchus nigellus* Cope, *Zool. Wheeler's Expl. W. 100th Mer.*, v, 671 (Arkansas R., Pueblo, Col.).

*Pimephales nigellus* Jordan, *Bull. Hayden's Geol. Surv.*, iv, 1878, 664 (Rio Grande R.).

*Habitat.*—Lake Champlain to the Upper Missouri, south to Tennessee and the Rio Grande. The species *H. confertus* Girard, is, in my opinion, not a distinct species, but only the western form of *promelas*, having the lateral line better developed.

## 2. *Pimephales notatus*.

*Minnilus notatus* Rafinesque, *Ichth. Oh.*, 1820, 47 (Ohio R.).

*Hyborhynchus notatus* Agassiz, *Amer. Jour. Sci. Arts*, 1855, 222 (Frankfort, Ky.; Scioto R.; Quincy, Ill.; Burlington, Iowa; Lebanon, Tenn.; Natchez, Miss.; Beardstown and La Salle, Ill.; Rome, N. Y.; L. Huron, L. Champlain); Cope, *Proc. Acad. Nat. Sci. Phila.*, 1864, 282; Cope, *Jour. Acad. Nat. Sci. Phila.*, 1868, 235; Günther, *Cat.*

Fish. Brit. Mus., vii, 1868, 182 (Montreal; Kanawha R.); Cope, Cyp. Penn., 1866, 392; Jordan, Ind. Geol. Surv., 1874, 224 (L. Michigan, Ohio R.); Nelson, Bull. Ill. Lab. Nat. Hist., i, 1876, 45; Jordan, Man. Vert., 1st ed., 1876, 275; 2d ed., 1878, 288; 3d ed., 1880, 288; Jordan, Proc. Acad. Nat. Sci. Phila., 1877, 45 (Lakes, Laporte Co., Ind.; St. Joseph's R., Kankakee R., Tippecanoe R., Lower Wabash R., White R., Ind.); Jordan, Bull. U. S. Nat. Mus., ix, 1877, 27; Jordan, Annals N. Y. Lyc. Nat. Hist., xi, 1877, 373 (Rock Castle R., Ky.); Jordan, Annals N. Y. Acad. Sci., i, 1877, No. 4, 107 (L. Michigan, Fox R., Rock R., Wisconsin R., White R., Ohio R., Salt R., Rock Castle R.); Jordan, Bull. Ill. Lab. Nat. Hist., ii, 1878, 55 (Mackinaw Cr., Woodford Co.; McLean Co.; Rock R. at Oregon; Little Wabash, Effingham Co.; Ill. R., Peoria; Crystal Lake, McHenry Co., Ill.); Forbes, Bull. Ill. Lab. Nat. Hist., ii, 1878, 79 (Food of *Hyborhynchus notatus*); Jordan & Brayton, Bull. U. S. Nat. Mus., xii, 1878, 63 and 78 (Chickamauga R., Cumberland R.); Hay, Proc. U. S. Nat. Mus., iii, 1880, 502 (Corinth, Miss.; Catawba Cr., Miss.; Noxubee R.); Hay, Bull. U. S. Fish Com., ii, 1882, 67 (Miss. R., Vicksburg; Big Black R., Yalabusha R., Tombigbee R., Chickasawha R.); Jordan, Rep. Geol. Surv. Ohio, 1882, iv, 840; Jordan & Gilbert, Synopsis Fish. N. A., 1883, 159; Bean, Cat. Fish. Internat. Fish Exhibition, London, 1883, 95 (Yellow Cr., Ohio); Jordan & Swain, Proc. U. S. Nat. Mus., 1883, 248 (Cumberland R., Ky.).

*Pimephales notatus* Gilbert, Proc. U. S. Nat. Mus., 1884, 200 (Salt Cr., Brown Co., Ind.).

*Hyborhynchus perspicuus* Girard, Proc. Acad. Nat. Sci. Phila., 1856, 179 (Arkansan R.); Girard, Pac. R. R. Surv., x, 1858, 231 (Arkansas R.).

*Hybognathus perspicuus* Günther, Cat. Fish. Brit. Mus., vii, 1868, 185.

*Hyborhynchus tenellus* Girard, Proc. Acad. Nat. Sci. Phila., 1856, 179 (Arkansas R.); Girard, Pac. R. R. Surv., x, 1858, 231 (Arkansas R.).

? *Hyborhynchus puniceus* Girard, Proc. Acad. Nat. Sci. Phil., 1856, 179 (Canadian R.); Girard, Pac. R. R. Surv., x, 1858, 232 (Canadian R.).

*Hyborhynchus superciliosus* Cope, Jour. Acad. Nat. Sci. Phila., 1868, 234 (Kanawha R.); Jordan, Man. Vert., 1st. ed., 1876, 276; 2d ed., 1878; 289; 3d ed., 1880, 289; Jordan, Bull. U. S. Nat. Mus., ix, 1877, 27; Jordan, Bull. Ill. Lab. Nat. Hist., ii, 1878, 56 (Cache R. and Clear Cr., Union Co.; Rock R., Ogle Co., Ill.); Jordan & Gilbert, Synopsis Fish. N. A., 1883, 160; Jordan & Swain, Proc. U. S. Nat. Mus., 1883, 248 (Cumberland R.).

*Habitat*.—St. Lawrence River to Delaware; Ohio Valley and Great Lake Regions, southward to Tennessee and Mississippi. Very abundant.

The nominal species, *H. superciliosus* Cope, is, as has already been noted by Jordan and Swain, but a spring form of the breeding male of *notatus*.